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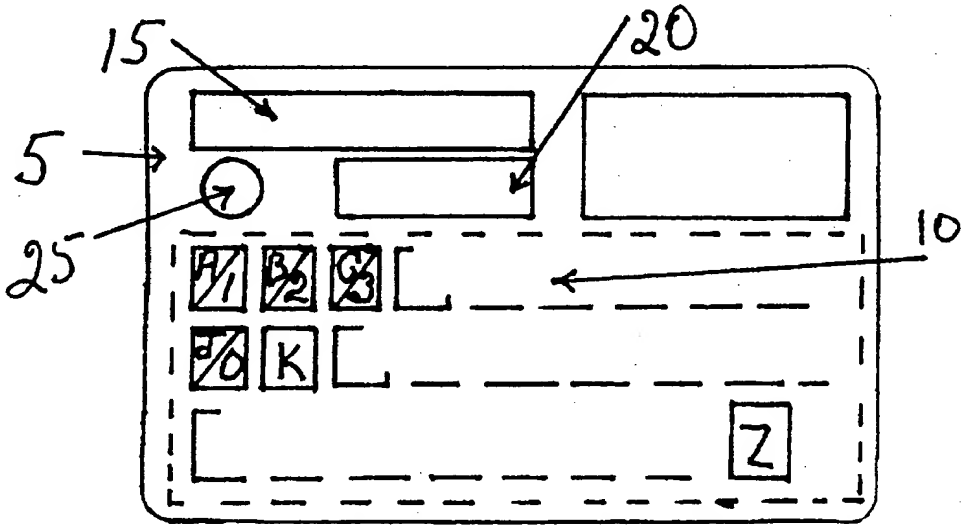
(54) **Security device**

(57) A pocket-sized electronic security device for securely recording and readily recalling one or more sequence(s) of numbers, comprises input means 10 capable of recording within memory means one or more sequence(s) of letters each sequence corresponding to a particular sequence of numbers, output display means 15, and access means by which the sequence or one of the sequences of letters may be input, causing the memory means to display the corresponding sequence of numbers on the display means. If an incorrect sequence is input during access, a random number is displayed.

FIG. 1



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SECURITY DEVICE.

This invention relates to a security device, and in particular to a pocket-sized electronic security device for secure recording and ready recall of one or more sequence(s) of numbers. Such sequences of numbers may, for example, be PIN numbers (Personal Identification Numbers) for use with plastic cards issued by banks or other financial institutions to obtain access to automatic cash-dispensers.

There is, at present, a general and increasing requirement on many people to remember several identification numbers, including, for example, PIN numbers, key numbers, access numbers for security locks, computers, telephones and photo-copying machines. In order that all of these numbers might be recalled when required, they are frequently written down, and it is not unknown for a PIN number to be either noted on the card itself or retained with the card. Such activities are potentially hazardous and costly to the financial institution and/or the customer concerned.

It is an object of the present invention to obviate or mitigate the foregoing problems.

Accordingly the present invention provides a pocket-sized electronic security device comprising input means capable of recording within memory means one or more sequence(s) of letters, each sequence corresponding to a particular sequence of numbers, output display means and access means, by which the sequence or one of the sequences of letters may be input, causing the memory means to display the corresponding sequence of numbers on the display means.

Preferably, the device is substantially the same size and shape as a standard bank/credit card.

Preferably, the input means and access means comprise a plurality of keys.

The keys preferably allow provision of all letters A to Z and all numerals 0 to 9.

The display means are preferably a Liquid Crystal Display (LCD).

The first few letters in any recorded sequence preferably form a password or code which, in the case of a multiplicity of sequences/

sequences is common to all such sequences, the remaining letter or letters defining the sequence of numbers which corresponds to each particular sequence of letters: should the correct password or code not be input during the access procedure, the error will not be indicated on the display and a random number will be generated and shown on the display means.

Preferably, instructions will be given by the display means for each stage of operation of the device, and the input means will switch automatically between letters and numbers as required according to the particular phase of the operation then in use.

An embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings, which comprise:

Fig 1 a front view of a pocket-sized electronic security device, according to the present invention;

Fig 2 a schematic diagram of the parts of the device of Fig 1;

Fig 3 a flow-chart showing an input or recording sequence of operations for the device of Fig 1; and

Fig 4 a flow-chart showing an access or recall sequence of operations for the device of Fig 1.

Referring to Fig 1, there is shown a pocket-sized electronic security device, generally designated 5, which incorporates a plurality of letter/number keys or buttons 10, a Liquid Crystal Display 15, a set or input key 20, a clear button 25 and a solar cell 30. This embodiment of the device 5 is substantially the same size and shape as a standard bank or credit card.

Referring to Fig 2, internally the security device 5 of Fig 1 provides input means 35 connected to memory means 40, within which it is capable of recording one or more sequences of letters corresponding to a sequence, or respective sequences, of numbers. The memory means is connected to the LCD 15, and is also pre-programmed to provide user instructions. The device 5 further provides access means 45 by which the sequence or one of the sequences of letters can be entered, causing the memory means to display the corresponding sequence of numbers on the display means 15. The input means 35 and access means 45 are provided together as the plurality of letter/number keys 10. The keys 10 allow/

allow the provision of all, or most, of the letters A to Z and all the numerals from 0 to 9, some of the keys being utilised both for letters and numbers and the transcription varying automatically in accordance with the function then being employed.

As shown in Fig 2, the device 5 is furnished with a power supply 50, which will take the form of a solar cell 30 and may also include a battery. The memory means 40 will at least partly comprise a non-volatile Random Access Memory (RAM) or bubble memory in order that withdrawal of the power supply does not result in the loss of the sequences of letters and numerals stored therein. The device 5 is also provided with a unit 55 capable of generating a random sequence of numbers when required.

An example will now be given of the device 5 in use for the secure recording of a four-digit PIN number. In this particular example, the device is so programmed that the sequences of letters which are input to the device and correspond to the numbers to be recorded may each only consist of precisely six letters.

On the solar panel being exposed to light, the device will be activated and automatically assume the access or recall mode. On first being used, to convert the device to the set or input mode in order to input the information which is to be recorded, the set or input key 20 is pressed and the instructions, as shown in the LCD, will request that the password be entered. The password in this instance comprises the first four letters of the selected letter sequence and for ease of recollection normally consists of a simple four letter word. Assuming the password selected is, say, FLAG, the letters F,L,A,G, are then entered by means of the keys 10, and the LCD will then request the designation of the Account, which will comprise the remaining two letters in the sequence and will normally be selected with a view to readily identifying the account to which the PIN number being recorded relates. In this instance, assuming the PIN number relates to, say, a Barclays Current Account, the identifying letters BC might be selected. On the letters B,C, being entered, the L.C.D. will then request a note of the number which is to be recorded. The required number, say 1234, is then entered - also by use of the keys, the function of the keys having automatically changed so that only numbers can be displayed and recorded.

On completion of the foregoing operation, the LCD will again request an account designation and other accounts and numbers can be/

be entered and recorded in like manner if so desired. The password FLAG need not be entered again for this purpose, but merely two different letters denoting the other accounts e.g. Nationwide Flexaccount - NF, Barclays Deposit Account - BD, etc. The device is then switched off when light to the solar panel is withdrawn, failing which it will automatically be switched off approximately twenty seconds after the last activity.

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When it is wished to recall a number, a roughly similar procedure is followed. On the device being activated by light to the solar panel, it again assumes the recall mode and the user instructions displayed on the LCD will request the password. In the example given, the word FLAG is entered and the LCD will then request the designation of the Account. Assuming the PIN number required is that of the Barclays Current Account, the letters BC are entered, whereupon the required number, 1234, is displayed on the LCD. The device would again be switched off by withdrawal of light from the solar panel or automatically on the lapse of approximately twenty seconds from the last activity, amd the information stored will continue to be retained for future use.

In the event that the wrong password is entered during the recall sequence, no indication will be given that it is incorrect and a random number will be generated and displayed on the LCD. Should the user at any time wish to clear all information stored in the device, other than the programming instructions, this will be achieved by pressing the clear button 25.

The embodiment of the invention hereinbefore described is given by way of example only, and is not intended to limit the scope of the invention in any way. In particular, a more complex version of the device 5 might well be produced incorporating an on/off switch and more function keys to enable sequences containing more or less letters to be used and numbers of varying lengths to be stored.

Finally, it should be understood that a purpose of this invention is to provide secure and easily operated means of recording PIN numbers for use with plastic cards issued by Banks, Building Societies etc. to obtain access to automatic cash dispensers or the like. In this connection, the random number facility will ensure that the correct password cannot be found by trial and error until a PIN number appears and it would, in the event of unauthorised use, lead to the retention of the card if incorrect PIN numbers were employed more than the permitted number of times. The invention preferably takes the form of a small device, little bigger than a credit card itself.

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The need, and enormous demand, for a product of this nature is self-evident in the number of plastic cards which many people now employ and the multiplicity of PIN and other numbers which they are required to remember. This, in turn, leads to the numbers being noted down with serious risk of misuse, as witnessed by the considerable concern currently being displayed by the Banks and other issuing institutions in this respect.

Apart from its potential as a separate self-contained unit, the device could be incorporated in the cover of diaries, wallets, credit card cases etc. and/or utilised for promotional purposes. In relation to credit card cases, these may be specifically designed to carry a number of credit cards and, in addition to the foregoing security device, also incorporate an alarm which gives an audible and/or visual warning when the case is removed more than a permitted distance from a control device in the user's possession.

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CLAIMS.

1. A pocket-sized electronic security device comprising input means capable of recording within memory means one or more sequence(s) of letters, each sequence corresponding to a particular sequence of numbers, output display means and access means, by which the sequence or one of the sequences of letters may be input, causing the memory means to display the corresponding sequence of numbers on the display means.

2. An electronic security device as claimed in Claim 1 which is substantially the same size and shape as a standard bank/credit card.

3. An electronic security device as claimed in Claims 1 and 2, the input means and access means of which comprise a plurality of keys.

4. An electronic security device as claimed in Claim 3, the keys of which allow provision of all letters A to Z and all numerals 0 to 9.

5. An electronic security device as claimed in any preceding claim, the display means of which consist of a Liquid Crystal Display (LCD).

6. An electronic security device as claimed in any preceding claim, in which the first few letters in any recorded sequence form a password or code which, in the case of a multiplicity of sequences is common to all such sequences, the remaining letter or letters defining the sequence of numbers which corresponds to each particular sequence of letters.

7. An electronic security device as claimed in claim 6, and in which, should the correct password or code not be input during the access procedure, the error will not be indicated on the display and a random number will be generated and shown on the display means.

8. An electronic security device as claimed in any preceding claim, in which instructions will be given by the display means for each stage of operation of the device, and the input means will switch automatically between letters and numbers as required according to the particular phase/

phase of the operation then in use.

9. An electronic security device substantially as described herein with reference to Figures 1 - 4 of the accompanying drawings.

10. An electronic security device as claimed in any preceding claim but restricted to the secure recording of four-digit PIN numbers, wherein the respective sequences of letters which are input to the device and correspond to each four-digit number consist precisely of six letters, the first four of which are common to all such sequences, substantially as described herein as an example of the device in use.

11. A credit card case or wallet of dimensions suitable for carrying credit cards and incorporating an electronic security device as claimed in any preceding claim.

12. A credit card case or wallet as claimed in claim 11, and incorporating an alarm which gives an audible and/or visual warning when the case is removed more than a permitted distance from a related control device.

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Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

Application number
GB [redacted]6627.8

Relevant Technical Fields

(i) UK Cl (Ed.M) G4H (HTG)

(ii) Int Cl (Ed.5) G07F, G07C

Search Examiner
M J DAVIS

Date of completion of Search
8 APRIL 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
1-12

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	WO 87/02491 A1 (BLACKWELL) eg page 4 lines 8-12, page 6 lines 12-23, page 9 lines 29-34	-

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

FIG. 1

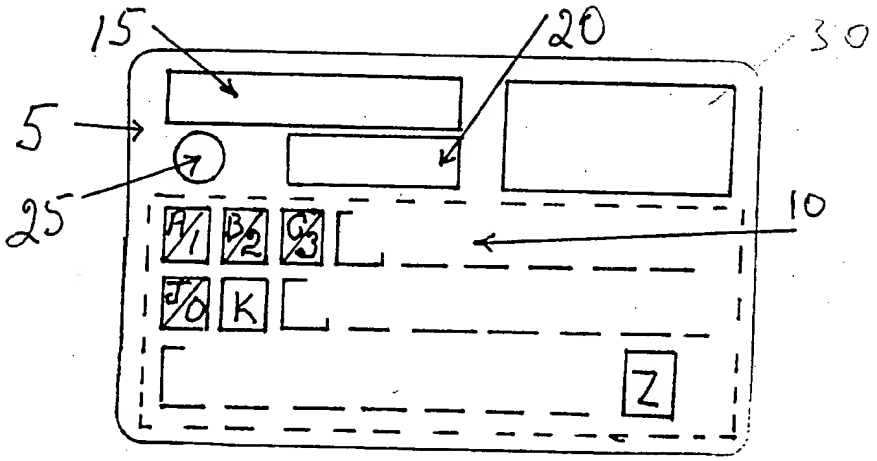


FIG. 2

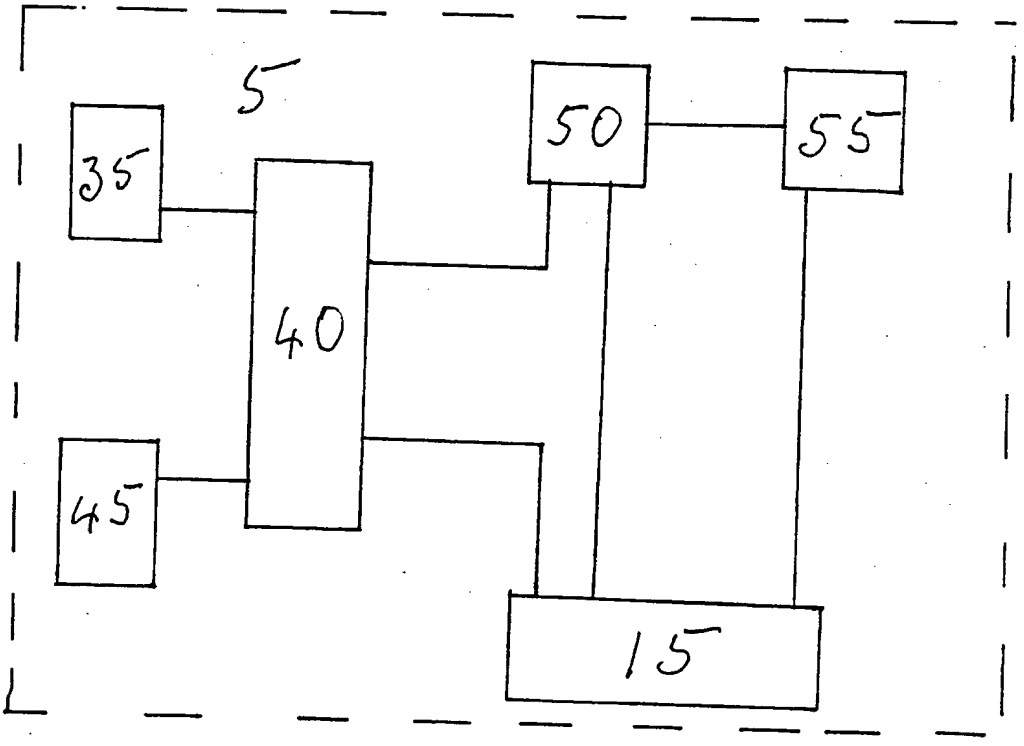


FIG. 3

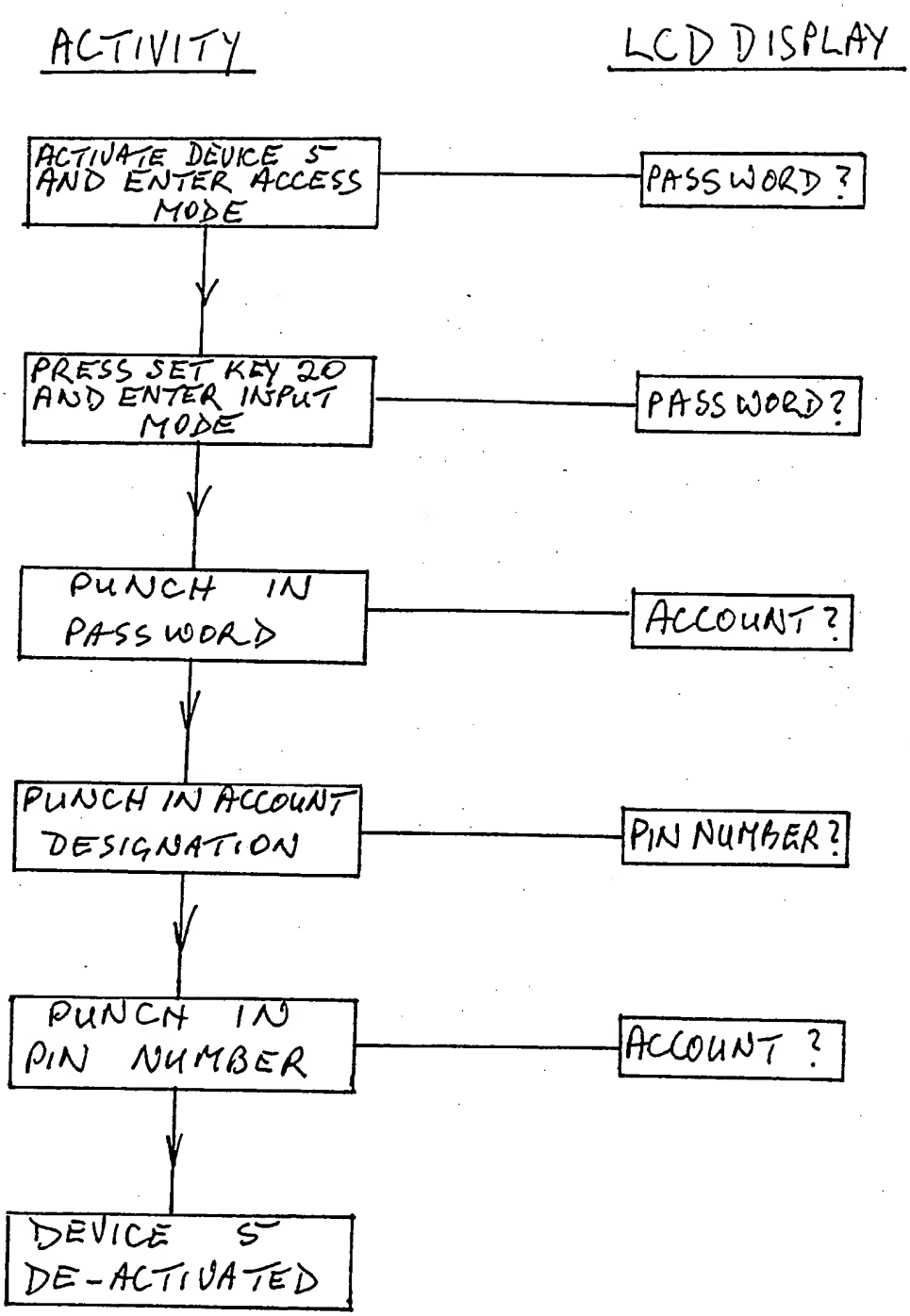
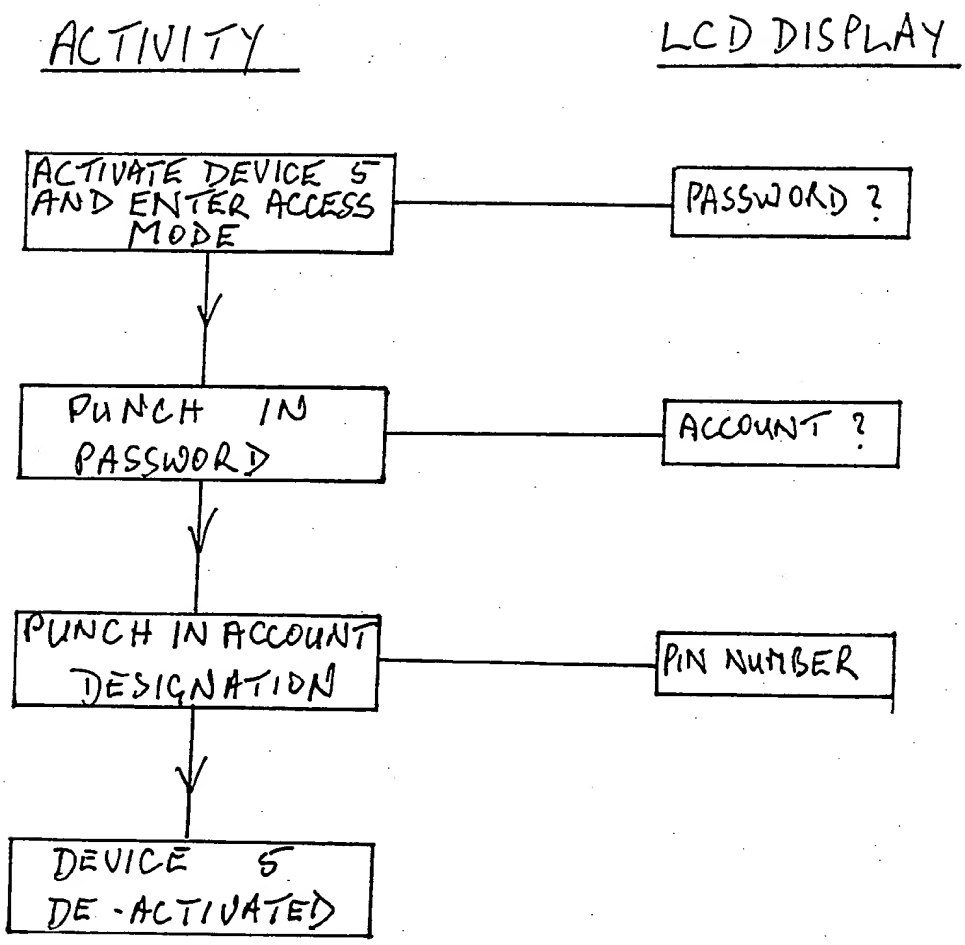

ACTIVITY
LCD DISPLAY
ACTIVATE DEVICE 5 AND ENTER ACCESS MODE
PASSWORD ?
PRESS SET KEY 20 AND ENTER INPUT MODE
PASSWORD?
PUNCH IN PASSWORD
ACCOUNT?
PUNCH IN ACCOUNT DESIGNATION
PIN NUMBER?
PUNCH IN PIN NUMBER
ACCOUNT ?
DEVICE 5 DE-ACTIVATED

FIG 4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LCD DISPLAY
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